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Before the
Federal Communications Commission
Washington, DC 20554

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
)
Revision of Part 15 of the Commission's) ET Docket No. 98-153 /
Rules Regarding Ultra-Wideband)
Transmission Systems)

To: The Commission

**COMMENTS OF ARRL, THE NATIONAL ASSOCIATION
FOR AMATEUR RADIO**

ARRL, The National Association for Amateur Radio (also known as the American Radio Relay League, Incorporated) ("ARRL"), by counsel and pursuant to the *Public Notice* DA 01-753, released March 26, 2001 (the Public Notice), requesting comments on reports addressing potential interference from ultra-wideband (UWB) transmission systems, hereby respectfully submits its comments. ARRL is, relative only to this proceeding, a participant in a coalition of at least 26 organizations concerned about potential interference from UWB devices to existing and future radio applications. However, ARRL is submitting these comments reflecting the interests of the more than 680,000 licensed radio amateurs in the United States. Any separate comments filed by the coalition are supported by ARRL as well.

I. Views on Reports Identified in Public Notice

1. ARRL has reviewed each of the reports identified in the Public Notice. These reports should be considered indicative of potential interference from UWB transmissions to amateur receiving systems. However, amateur receivers operating at fixed locations of necessity employ highly sensitive receivers and low-noise amplifiers having noise figures close to the theoretical minimum and considerably lower than the hand-held victim receivers

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typically tested in the studies. The directional effects of the amateur station antennas will increase the UWB interference in some azimuths (sometimes dramatically, depending on the victim frequency band) while reducing the interference in other directions.

2. The Qualcomm report, submitted March 5, 2001, details laboratory tests to assess the impact of UWB emissions on PCS phones using code division multiple access (CDMA). Although the report concerns interference from UWB to the PCS band, the broad nature of the interfering signal, such as depicted in Figures 4.2 and 4.3 of that report, indicates that any interference would extend to all VHF and UHF amateur bands. Qualcomm has assumed several UWB (Bluetooth-like) deployment scenarios for UWB devices that include personal computers, computer peripherals, and indoor cell phone coverage extensions. Each of these devices would place UWB devices in close proximity to, or collocation with, Amateur Station receiving systems.

3. The *Final Report, UWB-GPS Compatibility Analysis Project* (the Report) was prepared and submitted by the Strategic Systems Department of the Johns Hopkins University Applied Physics Laboratory (under contract by Time Domain Corporation, a leading UWB proponent). Dated March 9, 2001, the Report provides details concerning potential interference from UWB devices operating below 2 GHz to GPS receivers at L1 and L2 (centered at 1575.42 MHz and 1227.6 MHz, respectively). Considering the wide frequency range and roll-off characteristics assumed in this test for UWB, it is probable that interference to L1 or L2 will also adversely affect amateur station receivers in the band 1240-1300 MHz.

4. The NTIA report dated March 9, 2001 (*Assessment of Compatibility Between Ultrawideband (UWB) Systems and Global Positioning System (GPS) Receivers*), concerns

potential interference from UWB to L1 and L2 but also takes into account the newer L5 (1164-1188 MHz). This highly detailed report provides results that are highly subject to signal characteristics of the UWB transmission. It includes results of tests of single UWB devices and only a limited number of such devices for measurement of aggregate interference. As noted above, UWB interference to GPS receivers at L1, L2 and L5 should also apply to amateur station receivers operating in, at least, the band 1240-1300 MHz.

5. The DOT/Stanford University report dated March 21, 2001 (*Potential Interference to GPS from UWB Transmitters, Phase II Test Results*) builds on an earlier report of October 30, 2000. The March 21 report states, at page 46 in the Summary and Conclusions section, that the most “damaging” UWB waveforms are those of a periodic nature with spectral lines in specific bands, in this case GPS bands. These tests were for a single UWB emitter:

In the first phase of testing, all results were based on a single GPS aviation receiver, a single UWB emitter, and an accuracy measure of performance. A number of UWB waveforms were characterized in the testing, resulting in estimates of their impact on the GPS receiver relative to white noise. The model of the UWB spectrum as a combination of discrete spectral lines and broadband noise provided the most reliable predictor of how the UWB signal would impact the GPS receiver. The more predominant in magnitude and close in frequency to the GPS spectral lines that these distinct UWB lines are, the more damaging that waveform will be to the GPS measurements.

II. Status of ARRL Tests

6. The ARRL Reply Comments submitted October 27, 2000, outlined interference tests being conducted at the University of Southern California’s UWB laboratory. While the Amateur equipment for the test has been delivered by ARRL and is in place, and ARRL representatives had an initial on-site meeting, the tests have not yet been completed. As a non-profit organization, ARRL is not able to provide funding comparable to others doing testing. Therefore, the USC tests are being performed largely on a voluntary basis and are

understandably subject to other workload of the laboratory engineers. However, results are expected in the next several months and will be immediately reported to the Commission.

III. The Need for Definition

7. As has been noted by many respondents in this proceeding, interference is highly dependent on frequency range and signal structure. There is an urgent need for a far more specific definition of UWB than has been provided by the Commission to date, and as well the specification of key operating parameters and performance criteria such as frequency range, emission mask, peak power, pulse duration, pulse repetition and duty cycle. Without these minimal operating parameters specified, any interference calculations are of necessity based on assumptions which may be wholly inapplicable to the UWB device ultimately deployed.

8. There are in the *Notice of Proposed Rule Making*, FCC 00-163, 65 Fed. Reg. 37332, released May 11, 2000 in this proceeding, no proposed rules or parameters. This omission makes it difficult or impossible to conduct tests or analyses against UWB transmission system configurations which may be deployed in the near term. This lack of definition makes testing expensive because it is necessary to test using a wide range of UWB parameters, and the tests are reduced to anecdotal examples.

9. The Commission cannot fairly proceed based on the record created to date. It is insufficient to determine the actual interference potential of these devices (in some configurations) because the definition of UWB is not specific. The Commission must, before making any decision in this proceeding, propose specific definitional and operating rules for UWB and request comment from interested parties on those rules, before issuing a report and order.

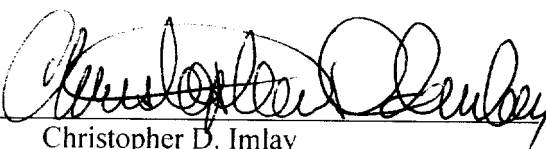
IV. Conclusions and Recommendations

10. The Commission should take a reasonably conservative approach in this revolutionary proceeding until further tests are complete and the results reviewed and subjected to technical analysis. Furthermore, given the apparent interference contours that are created by these devices, the Commission should restrict UWB operation in existing crowded bands, to operation above 6 GHz. Therefore, the foregoing considered, ARRL, the National Association for Amateur Radio respectfully requests that the Commission take no action in this proceeding unless it is consistent with these comments.

Respectfully submitted,

ARRL, THE NATIONAL ASSOCIATION
FOR AMATEUR RADIO

225 Main Street
Newington, CT 06111

By: 
Christopher D. Imlay
Its General Counsel

BOOTH FRERET IMLAY & TEPPER, P.C.
5101 Wisconsin Avenue, NW, Suite 307
Washington, DC 20016-4120
(202) 686-9600

April 25, 2001

CERTIFICATE OF SERVICE

I, Christopher D. Imlay, do hereby certify under penalty of perjury that I caused to be served, this 25th day of April, 2001, via United States Mail, postage prepaid, a copy of the "COMMENTS OF ARRL, THE NATIONAL ASSOCIATION FOR AMATEUR RADIO" on the following:

Chairman Michael Powell
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Commissioner Harold Furchtgott-Roth
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Commissioner Susan Ness
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Commissioner Gloria Tristani
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Mr. Bruce Franca, Acting Chief
Office of Engineering and Technology
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Dr. Michael Marcus
Associate Chief of Technology
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Kathy D. Smith, Esquire
Chief Counsel
United States Department of Commerce
National Telecommunications and
Information Administration
Washington, DC 20230

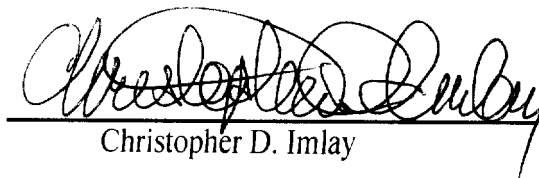
Dean R. Brenner, Esquire
Attorney for QUALCOMM Incorporated
Crispin & Brenner, P.L.L.C.
1156 15th Street, NW, Suite 1105
Washington, DC 20005

Julius Knapp, Chief
Policy & Rules Division, OET
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Karen E. Rackley, Chief
Technical Rules Branch
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

John A. Reed, Senior Engineer
Technical Rules Branch
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Robert L. Petit
Counsel for Time Domain Corporation
Wiley, Rein & Fielding
1776 K Street, NW
Washington, DC 20006



Christopher D. Imlay